Computer Science 136 **Notes:**
Data Structures
Lecture #8 (September 27, 2021)

1. Sensing lab is challenging people...
   (a) Due tomorrow, 5pm.
   (b) Many office hours today, only 2 tomorrow.
   (c) Questions?
2. Recursion, continued.
   (a) From before: Towers of Hanoi:

```
public static void moveTower(int n, String src, String dest, String using)
{
    if (n == 1) System.out.println("Move piece from "+src+" to "+dest);
    else {
        moveTower(n-1, src, using, dest);
        System.out.println("Move piece from "+src+" to "+dest);
        moveTower(n-1, using, dest, src);
    }
}
```

   (b) Can this be simplified?
   (c) Proving it will take $2^n - 1$ moves.
3. Several different approaches to working with string recursion.
   (a) Some comments on the `char` type.
   (b) Checking if a character is a vowel.
   (c) Checking if a string contains a vowel.
   (d) Checking if a string is all vowels.
   (e) Gathering the first vowel from a string.
   (f) Gathering all the vowels from a string.
4. Thinking about permuting the characters of a string.
   (a) Collecting the results of inserting a single character at all positions in a string.
   (b) Using this approach to build a string permuting routine.